Specialty Conference

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Symposium on Adolescent Gynecology and Endocrinology

Part III: Venereal Diseases in Adolescents and Contraception in Teenagers

Venereal Diseases in Adolescents

PHYLLIS A. OILL, MD*

VENEREAL DISEASE is epidemic in the United States, with gonorrhea ranking first and syphilis third among the nationally notifiable diseases.[143] Adolescents aged 15 to 19 and adults from 20 to 24 bear a disproportionate share of the increase in reported gonorrhea infections, and of the absolute number of cases. More than two thirds of all reported cases of gonorrhea occur among persons younger than 25 years, with one of every four reported cases occurring among adolescents (persons 10 to 19 years of age).[143,144] In 1975, there were 266,613 cases of gonorrhea and 3,719 cases of infectious syphilis reported in the 15 to 19 age group. Reported cases of venereal disease represent only a small part of the problem because private physicians treat about 80 percent of the diagnosed gonorrhea and syphilis cases, and report only about one in nine cases of gonorrhea and one in eight cases of syphilis.[145] It is conservatively estimated that about one adolescent actually becomes infected with either syphilis or gonorrhea each minute, or that 1,700 infections occur each day, for well over half a million each year.[146]

The adolescent period is one of rapid and often chaotic change, with adolescents dealing with the important psychological task of self-identity or self-concept which is involved in defining the sexual being.[147] It is sexual activity that places one at risk for venereal disease and adolescents by definition are increasingly sexually active, and tend to base their maturity level upon sexual involvement.[148] The combination of the adolescent's sexual exploration, more permissive societal acceptance of sexual attitudes and behaviors, and the technologic advances in contraception are all implicated in the venereal disease epidemic.[149,150] Additionally, the fact that asymptomatic gonococcal disease occurs in a significant number of females and males[151-153] further complicates the problem. Table 7 lists the factors associated with the venereal disease epidemic in adolescents.

There are numerous diseases that are acquired or spread by sexual contact. The following is a

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TABLE 7.—*Factors Implicated in Adolescent Venereal Disease*

Sexual permissiveness
Self-definition
Contraceptive use
Attitudes and education
Asymptomatic disease
Male homosexuality

brief discussion of the most common of the sexually transmitted diseases affecting adolescents.

Gonorrhea

Gonorrhea is spread almost exclusively through sexual contact. A single contact with an infected female is estimated to carry with it a 22 percent risk of infection for her male consort.[154] The disease is caused by *Neisseria gonorrhoeae,* a Gram-negative coccus that can penetrate and readily infect mucous membranes. The disease has diverse clinical syndromes, and only an overview will be given since a number of extensive reviews have been published.[155-158]

Asymptomatic disease occurs in both males and females, with females accounting for most of the asymptomatic infections.[151,159] The incubation period for gonorrheal urethritis in the male is usually two to eight days with the sudden onset of dysuria, and urinary urgency and frequency. There is an associated mucoid discharge that rapidly becomes purulent and profuse. The patient is afebrile, and without treatment the symptomatic urethritis may spontaneously resolve over a period of weeks. Direct spread of the infection may result in prostatitis, epididymitis and seminal vesiculitis.[160] These infections are often associated with fever.

In females, disease may begin with dysuria, and urinary urgency and frequency after an incubation period of two to eight days. However, symptomatic urethritis is frequently of short duration and often mild or asymptomatic. Endocervicitis gives rise to a mucopurulent discharge that varies from scant to profuse. A history of increased vaginal discharge and dysuria five to ten days after intercourse or occurring just after menstruation is suggestive of gonorrhea. Coincidental vaginal discharge from monilia, trichomonas, or other vaginal or cervical infections is common.[161] Contiguous spread can cause salpingitis which is usually bilateral and many lead to pyosalpinx and formation of tubo-ovarian abscess. Involvement of Bartholin and Skene glands is common and abscess formation may occur.[162]

Proctitis is usually asymptomatic, but may be manifested by anal discharge, burning rectal pain, blood and pus in the stool, and pain on defecation.[163] In females, proctitis may occur secondary to contiguous spread from infected vaginal secretions to the anal area, or by direct implantation of the organism during anal intercourse.[164] Pharyngitis is also usually asymptomatic, but gonorrhea probably can cause symptomatic pharyngitis, tonsillitis and gingivitis.[165] In females, pharyngitis is found in those who practice fellatio. In men, pharyngitis and proctitis are encountered in those who have homosexual contacts.

Occasionally, invasion of the blood occurs and *N gonorrhoeae* may disseminate and produce infection at a distant focus. Joints are the most frequent extragenital sites of localization, but tenosynovitis, skin lesions, hepatitis, endocarditis, meningitis and infection at other foci may also occur.[166,167] Dissemination probably occurs more frequently in females because they are more often asymptomatic and constitute the largest reservoir. It is clinically often associated with pregnancy or menstruation.

In males, Gram stain of urethral exudate shows Gram-negative intracellular diplococci (95 percent sensitive and specific). A culture must be obtained when the patient is asymptomatic or smear is nondiagnostic. Culture from pharynx and anorectum is also necessary in homosexual males. In females, cultures need to be obtained from the endocervix and anorectum. Gram stain only reaches 50 percent sensitivity in gonorrheal cervicitis. Culture from the pharynx is also necessary in patients who practice fellatio. In disseminated gonococcal infection, cultures should be obtained from the blood, skin lesions and joint effusion, if present. In addition, culture from the urethra or cervix, pharynx and anorectum is necessary because disseminated disease has been reported as originating from any one of the above sites. The specimens should be inoculated directly onto culture medium. Culture medium of choice is Thayer-Martin medium or a suitable transport medium (such as Transgrow) for sites where other organisms usually reside. Chocolate agar medium is used for those sites that are usually sterile (such as synovial fluid and cerebral spinal fluid).

Recommendations for treatment for both uncomplicated and complicated gonorrhea have been issued by the Center for Disease Control.[168] Uncomplicated gonorrhea in both males and females is preferably treated with aqueous procaine peni-

cillin G, 4.8 million units given by two intramuscular injections at a single visit, along with 1 gram of probenecid given orally. Alternatives to parenteral administration of penicillin G are oral administration of ampicillin, 3.5 grams, or amoxicillin, 3.0 grams, with 1 gram of probenecid. Patients allergic to penicillin may be treated with tetracycline hydrochloride, 0.5 gram given by mouth four times a day for five days (total dosage 10.0 grams). A single injection of spectinomycin hydrochloride, 2 grams intramuscularly, should be administered to patients with allergy to both penicillin and tetracycline and in cases of treatment failures or infection with penicillinase-producing organisms.[168,169] Disseminated gonococcal infections may require admission of the patient to hospital and administration of aqueous penicillin G, 10 million units per day intravenously, until there is clinical defervescence of symptoms, followed by orally given ampicillin, 0.5 grams four times a day to complete a seven day course. Oral therapy with ampicillin, amoxicillin or tetracycline is also efficacious.[168] Males and females with known recent exposure to gonorrhea should receive the same treatment as persons known to have gonorrhea.

Follow-up urethral and other appropriate cultures should be carried out in men, and cervical, rectal and, if indicated, pharyngeal cultures should be done in women 7 to 14 days after completion of therapy. This is now recommended routinely.

Syphilis

Syphilis accounts for less than 1 percent of the venereal disease encountered in adolescents[171,172] and, untreated, has significant consequences later in adulthood. *Treponema pallidum,* a spirochete, is transmitted through direct contact with an infectious lesion, and invades intact mucous membranes and abraded skin. Reviews of this disease have been published.[174-176]

Primary syphilis develops after an incubation period that ranges from 10 to 90 days. The classical chancre appears initially as a papule, which then evolves into an indurated, painless, ulcerative lesion with raised, firm borders.[173] It is usually accompanied by bilateral, discrete, painless inguinal adenopathy. Careful examination is necessary to identify lesions in the vulvar area, cervix, perirectal skin and rectal mucosa. Extragenital sites, such as the fingers, lips, pharynx and tongue, can also be involved. The primary lesion heals in one to six weeks without treatment.

Secondary syphilis occurs approximately two to ten weeks after the appearance of the primary lesion, and lasts from one to six weeks. This stage is heralded by a rash which is usually bilaterally symmetrical, can involve the palms and soles, may be macular, papular, follicular or papulosquamous, and, rarely, pustular or nodular.[176] It is usually dry and nonpruritic. Condylomata lata, another skin manifestation, are flat, moist papules which occur primarily in the intertriginous areas. Constitutional symptoms, which may precede or accompany the lesions, include headache, malaise, anorexia, fever, sore throat and generalized lymphadenopathy.[174]

In the hands of an experienced physician, a dark-field microscopic examination of material scraped from lesions is the single most accurate test in diagnosing primary syphilis. Additionally, serologic tests can confirm the diagnosis. A VDRL test becomes positive in 10 to 90 days following the initial lesion. In approximately 50 percent of infected persons a VDRL test is positive within the first three weeks, while in 90 percent it is positive at six weeks. A positive VDRL test is present in essentially all cases of secondary syphilis. The fluorescent treponemal antibody absorbed test (FTA-ABS) can be used to confirm the diagnosis and eliminate biologic false-positive VDRL tests.[177] When dealing with adolescents, a population at risk for drug abuse as well as venereal disease, the possibility of a biological false-positive VDRL secondary to heroin abuse must be considered.[178]

The drug of choice in the treatment of primary and secondary syphilis is benzathine penicillin, 2.4 million units given intramuscularly, administered in two sites at one visit. In a penicillin-allergic patient, tetracycline or erythromycin, 0.5 gram given orally four times a day for 15 days (total 30 grams) can be used as an alternative.[179] It should be noted that the procaine penicillin treatment of gonorrhea will treat *incubating* syphilis, but not primary disease.[180]

At the time of therapy it is prudent to advise the patient of the possibility of Jarisch-Herxheimer reaction, which occurs in over 50 percent of patients with primary and secondary syphilis.[181] It characteristically occurs within 12 hours of treatment and resembles an influenza-like syndrome of fever, lethargy, myalgia, headache and recrudescence of the rash. It is symptomatically improved by antipyretics. It is relatively insignificant among patients with early syphilis, and

alerting the patient about the reaction and home management prevent unnecessary patient alarm.[182]

Nonspecific Urethritis

Nonspecific urethritis (NSU), also known as postgonococcal urethritis or nongonococcal urethritis, is an inflammation of the urethra caused by organisms other than the gonococcus. It is exceedingly common in males: an estimated 2.5 million cases in 1976.[143] NSU may be caused by a variety of organisms, but *Chlamydia trachomatis* accounts for most of the diagnosed NSU.[183-185]

Generally, symptoms may be consistent with gonorrheal urethritis: dysuria, urethral discharge or urinary frequency. The discharge is usually scant and watery, although it may be purulent.[185]

The key to diagnosis is by laboratory means. Gram stain of the urethral discharge (expressed or obtained by swab) is imperative to rule out the presence of *Neisseria gonorrhoeae*. Exudates that contain polymorphonuclear leukocytes, but no Gram-negative diplococci, make the diagnosis.[186] Culture for *N gonorrhoeae* should be done routinely.

Treatment is with tetracycline, 0.5 grams given orally four times a day for seven days.[184] As part of the management of NSU, every attempt should be made to treat the patient's sex partner.

Herpes Genitalis

Herpes genitalis, caused by Herpesvirus hominis type 2 (HVH-2) is sexually transmitted with an estimated 300,000 new cases in 1976.[143] Adolescents may account for 25 percent to 50 percent of all patients with genital herpetic infection.[187] The virus infects cells by contiguous spread and then is thought to establish a latent infection in the dorsal root ganglia of the spinal cord. It is an endogenous virus, therefore, that is responsible for recurrent disease.[188]

The clinical features vary from person to person with up to 50 percent of all genital HVH-2 infections being asymptomatic.[189] Primary genital herpes occurs in patients without HVH-2 antibodies and can be severe, particularly in the female. Symptoms appear three to four days following exposure and include fever, headache, malaise, anorexia and lymphadenopathy. Lesions involve the external and internal genitalia and start as small, painful vesicles on an erythematous base which become ulcerative and heal in three to six weeks depending on the severity of the disease. Inguinal or pelvic pain, dysuria, dyspareunia and urinary frequency may also be present.[190]

Recurrent HVH-2 infections are milder than primary disease. Factors said to precipitate recurrences include temperature elevation, emotional disturbances, premenstrual tension, local trauma and severe systemic disease.[189] Lesions tend to occur in the same sites as primary disease, but are often inconspicuous. They are usually vesiculoulcerative lesions in localized patches. The vesicles rupture in 24 to 48 hours forming ulcers which crust and heal in seven to ten days.

The diagnosis can be confirmed by isolation of the virus, electron-microscopy of vesicular fluid, exfoliative cytology (Papanicolaou smear), cytologic examination or a fourfold rise in serum antibody titer against HVH-2. The cytologic examination (the Tzanck test) is the most simple and readily available. It is carried out in the following manner: scrapings from the base of the ulcer are fixed on a slide with absolute or methyl alcohol for ten minutes, and then stained with Giemsa. The finding of multinucleated giant cells or typical eosinophilic intranuclear inclusions (Cowdry type A) is diagnostic.[190]

Prevention and treatment of genital herpes infection is difficult because of the lack of knowl-

TABLE 8.—*Minor Sexually Transmitted Diseases*

Disease	*Clinical Features*	*Diagnosis*	*Treatment*
Chancroid	Multiple, painful, autoinoculable ulcers; painful inguinal adenopathy, unilateral buboes	History of exposure; clinical signs and symptoms; smears; culture	Sulfonamides Tetracycline Streptomycin
Lymphogranuloma venereum	Transient genital lesion; inguinal adenopathy with genital groove; proctitis; rectal strictures, elephantitic changes	Clinical signs and symptoms; Frei test; complement fixation	Sulfonamides Tetracycline Dilitation Surgical operation
Granuloma inguinale	Insidious onset; mildly tender ulcers with granular base; pseudobuboes; chronic impairment of health	Donovan bodies in spreads or biopsies; complement fixation test; clinical signs and symptoms	Tetracycline Streptomycin Chloramphenicol

TABLE 9.—*Estimated Numbers of Teenage Pregnancy in the United States in 1976**

Total	1,010,000	
Premarital	780,000	(77% of total)
Not intended	554,000	(71% of premarital)
No contraception	438,000	(79% of not intended)

*Reproduced by permission from Zelnik and Kantner.[197]

edge concerning immunity to infection, and the pathogenesis of recurrent infection. Little benefit has been obtained by using various immunizing agents (such as autoinoculation, smallpox vaccination, vaccine from inactivated HVH-2).[191] The mainstay of treatment is symptomatic therapy; antiviral agents, ether and photodynamic inactivation have not been shown to be efficacious either acutely or for recurrent disease. Local and systemic analgesics help in relief of pain. Mild antiseptic compresses (benzalkonium 1:4,000; potassium permanganate 1:6,000) can be applied three to four times per day to reduce the risk of bacterial infection. Systemic antibiotics should be administered only if secondary bacterial infection occurs. Steroids, given locally or systemically, are contraindicated.

Minor Venereal Diseases

Chancroid, granuloma inguinale and lymphogranuloma venereum account for less than 1 percent of all reportable venereal diseases.[143,146] Table 8 gives a brief summary of these diseases. The reader is referred to more comprehensive publications for detailed discussion of these diseases.[192-195]

Venereal warts, caused by papillomavirus, infect the genital and anal areas and approximately 700,000 infections occurred in 1976.[143] The appearance of genital warts is too familiar to require detailed description. The lesions are multiple and polymorphic, and may coalesce into large masses. In the male, they occur most often in areas subjected to trauma during coitus and are somewhat commoner in uncircumcised than circumcised males.[196] Anal warts in males are associated with anal intercourse and, therefore, are found in homosexual males. In females, warts often appear first at the fourchette and on the adjacent labia.[196] They occur on other parts of the vulva and in 20 percent of patients spread to the perineum and anus. The vagina and cervix can also be involved. Patients with anal warts should have anoscopy to evaluate the extent of involvement.

The best known treatment of genital warts is cytotoxic therapy with podophyllin, 10 percent or 25 percent solution in spirit of tincture of benzoin.[196] It is applied to the lesion, allowed to dry and washed off in three to four hours. The treatment is carried out once or twice a week, and if there has been no significant improvement in about a month then alternative therapy should be considered (cautery, diathermy, cryosurgery).

Conclusion

In summary, adolescence is a time of overt exploration of sexual identity. This exploration often leads to multiple sexual contacts and exposure to sexually transmitted diseases. Education of adolescents about venereal disease risks and aggressive diagnosis by physicians are necessary to ameliorate the present venereal disease problem in adolescents.

Contraception in Teenagers

DANIEL R. MISHELL, JR., MD

IN THE UNITED STATES teenage pregnancy consitutes a problem of epidemic proportion. The number of births for women of most age groups in the United States is steadily decreasing so that this country is approaching zero population growth. However, there is an exception to this trend in the teenage population. The number of teenage pregnancies has remained relatively constant over the last five years despite the increased use of contraceptives.

In 1976 there were slightly more than 1 million teenage pregnancies in the United States. Of these, nearly four fifths, or 780,000, occurred in women who were not married—and of that group, 71 percent of the pregnancies were not intended (Table 9).[197] It was estimated, therefore, that there were 554,000 premarital pregnancies in the United States that were not intended. Of these pregnant women, 438,000 (79 percent) were not using contraception at the time that conception occurred. The problem of unintended teenage pregnancies persists, despite the fact that more teenagers than ever are using contraception because more teenagers are engaging in sexual activity.

Zelnik and Kantner carried out surveys of

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sexual and contraceptive experience among unmarried 15- to 19-year-old women in the United States in both 1971 and 1976. They found that there was a 30.2 percent increase in the incidence of premarital intercourse among never married teenagers between 1971 and 1976 (Table 10).[198] The percentage increase occurred at all ages and was greater in whites than blacks. By the age of 19 years, 55.2 percent of never married women have engaged in sexual intercourse. When comparing the results of these surveys, these investigators concluded that in the United States girls are having intercourse at an earlier age and with more partners but probably at about the same frequency as in the past. Zelnik and Kantner also found that the percentage of women aged 15 to 19 who had premarital first pregnancies increased from 9.0 percent to 11.6 percent between 1971 and 1976 (Table 11).[199] This increase occurred primarily among white teenagers, from 6.4 percent to 9.3 percent, while the 25.5 percent incidence of black teenagers who had premarital conceptions remained constant over this five-year period. The percentage of all teenagers who had premarital intercourse and conceived also remained relatively constant. Therefore, the increased percentage of teenagers who became pregnant was due to more women having premarital intercourse.

About 26.9 percent of sexually experienced teenagers use contraception always and another 31 percent never use it, with the remaining 42.1 percent using contraceptives occasionally (Table 12).[197] The incidence of premarital pregnancies is inversely proportionate to the use of contraception. Those who never use contraception have about a six times greater chance of conceiving than those who use contraception always, and about a two and a half times greater chance of conceiving than those who use contraception occasionally. In 1976, as noted above, 71.2 percent of premarital pregnancies in teenagers in the United States were not intended. Couples were using contraception at the time of conception in only 21.1 percent of these pregnancies (Table 13).[197] When contraception was used, about a third of the pregnancies, 7.4 percent, occurred while the couples were using the more effective medical forms of contraception. These methods, which include oral contraceptives, intrauterine devices or diaphragms, require a visit to a physician or clinic. The remaining two thirds, 13.7 percent, of these conceptions occurred while using less effective nonmedical types of contraception, such as rhythm, withdrawal, condoms or foam. In 78.9 percent of nonintended premarital pregnancies, the couples were not using contraception at the time the conception occurred.

Consistent use of effective contraception by teenagers would have had a dramatic impact on the number of unintended premarital pregnancies that occurred in teenagers in the United States in 1976. Of the 780,000 premarital pregnancies, 554,000 were not intended and 438,000 occurred without use of contraception. If no contraception had been used by teenagers premaritally, an addi-

TABLE 10.—*Percentage of Never-Married Women Aged 15 to 19 Who Have Ever Had Intercourse, by Age and Race, 1976 and 1971**

	Study Year and Race								
	1976			*1971*			*Percent Increase 1971-1976*		
Age	*All*	*White*	*Black*	*All*	*White*	*Black*	*All*	*White*	*Black*
15-19	34.9	30.8	62.7	26.8	21.4	51.2	30.2	43.9	22.5
15	18.0	13.8	38.4	13.8	10.9	30.5	30.4	26.6	25.9
16	25.4	22.6	52.6	21.2	16.9	46.2	19.8	33.7	13.9
17	40.9	36.1	68.4	26.6	21.8	58.8	53.8	65.6	16.3
18	45.2	43.6	74.1	36.8	32.3	62.7	22.8	35.0	18.2
19	55.2	48.7	83.6	46.8	39.4	76.2	17.9	23.6	9.7

*Reproduced by permission from Zelnik and Kantner.[198]

TABLE 11.—*Percentage of Women Aged 15 to 19 Having Premarital First Pregnancy**

	1971			*1976*		
	White	*Black*	*All*	*White*	*Black*	*All*
Women who had premarital first pregnancy	6.4	25.5	9.0	9.3	25.5	11.6
Women who had premarital intercourse	24.3	47.1	29.8	25.2	39.5	28.3

*Reproduced by permission from Zelnik and Kantner.[199]

tional 680,000 premarital pregnancies would have occurred. However, if contraception had been used consistently by all unmarried teenagers, the number of premarital teenage pregnancies would have dropped from 780,000 to 467,000, a decrease of 40 percent.[197]

To reduce the number of unwanted teenage pregnancies with their attendant psychological, sociological and economic problems, all teenagers engaging in sexual intercourse should use effective contraception consistently. Comparing the surveys of 1971 and 1976, Zelnik and Kantner found that the percentage of sexually experienced teenagers aged 15 to 19 who had always used contraception increased almost twofold, 18.4 percent to 30.0 percent, between 1971 and 1976, but there was also an increase in the number who had never used contraception from 17.0 percent to 25.6 percent (Table 14).[198] This latter figure may be misleading because many of the women in this group had very infrequent episodes of sexual intercourse. Of more importance is the fact that the percentage of teenagers who had used contraception at the last episode of sexual intercourse had grown from 45.4 percent to 63.5 percent in the five years. This increased use of contraception at the time of last intercourse occurred in teenagers of all ages, with the greatest percentage increase in the younger teenagers (Table 15).[198] Oral contraceptives are the most frequently used method of contraception by sexually experienced teenagers, being used by 31.2 percent in 1976 (Table 16).[198] Use of oral contraceptives increased more than twofold between 1971 and 1976 among all teenagers and in the 15- to 17-year-old age group almost tripled. The percentage of teenagers using IUD's remains small, about 2 percent. Condom usage was very close in popularity to oral contraceptives in 1971, but its use decreased during the five years.

Use of oral contraceptives by teenagers should be encouraged because it is the most effective method of contraception. In women of all ages

TABLE 12.—*Percentage of Teenagers With Premarital Sexual Experience Who Use Contraception**

	All Women	*Women Who Conceived*
Always	26.9	10.9
Sometimes	42.1	23.9
Never	31.0	58.0

*Reproduced by permission from Zelnik and Kantner.[197]

TABLE 13.—*Percentage of Prematurally Pregnant Teenagers and Use of Contraceptives at Time of Conception of Unintended Pregnancies**

	Percent
Intended	28.8
Not intended	71.2
Medical method of contraception	7.4
Nonmedical method of contraception	13.7
No contraception	78.9

*Reproduced by permission from Zelnik and Kantner.[197]

TABLE 14.—*Use (Percent) of Contraception by Sexually Experienced Teenagers in the United States**

	Never	*Sometimes*	*Always*	*Last Time*
1971	17.0	64.6	18.4	45.4
1976	25.6	44.5	30.0	63.5

*Reproduced by permission from Zelnik and Kantner.[198]

TABLE 15—*Percent of Sexually Experienced Never-Married Women Aged 15 to 19 Who Used Contraception During Last Intercourse in 1971 and 1976**

Age	*1976*	*1971*
15-19	63.5	45.4
15	53.8	29.9
16	56.3	38.8
17	61.8	45.2
18	70.3	48.8
19	68.8	55.3

*Reproduced by permission from Zelnik and Kantner.[198]

TABLE 16.—*Percent Distribution of Sexually Experienced Never-Married Women Aged 15 to 19, According to Method Used at Last Intercourse, 1976 and 1971.**

	Age		
Method	15-19	15-17	18-19
1976			
Pill	31.2	21.6	42.9
Intrauterine device	2.2	1.3	3.4
Condom	12.6	15.2	9.3
Douche	2.3	2.4	2.3
Withdrawal	10.6	14.9	5.4
Other	4.5	3.0	6.3
None	36.6	41.6	30.4
TOTAL	100.0	100.0	100.0
1971			
Pill	15.1	7.7	23.0
Intrauterine device	0.8	0.2	1.4
Condom	14.4	17.3	11.2
Douche	1.7	2.1	1.3
Withdrawal	10.3	9.4	11.3
Other	2.9	2.4	3.4
None	54.8	60.9	48.4
TOTAL	100.0	100.0	100.0

*Reproduced by permission from Zelnik and Kantner.[198]

the failure rate of oral contraceptives is much less than that of all methods that need to be used at the time of intercourse. Because sexual intercourse is unplanned and frequently multiple in young teenagers, all coitus related methods such as condoms, diaphragms, contraceptive foams or suppositories have a higher failure rate than use of these same methods in older women. Oral contraceptives should be the method of choice in healthy teenage women.

There are some concerns among clinicians about use of oral contraceptives by young teenagers. One concern is that ingestion of these steroids might cause premature closure of the epiphyses. This concern is unwarranted because by the time menarche has occurred the process of epiphyseal closure has already been initiated by endogenous estrogen production, and cannot be accelerated by exogenous sex steroids. Use of exogenous estrogens to prevent growth of potentially tall girls needs to be initiated before the growth spurt, years before the menarche, in order to accelerate the time of epiphyseal closure and decrease the ultimate height.

Another concern expressed is that use of these potent steroids in young teenagers will cause permanent hypothalamic pituitary dysfunction. This concern is also unwarranted provided a girl has already established regular cyclic menses. Use of contraceptive steroids by teenage women does not cause a higher frequency of ovulatory problems after their discontinuation than in older women, provided they both have regular menstrual cycles before starting the steroids. In a retrospective study comparing characteristics of women in whom post-pill amenorrhea developed and those who had secondary amenorrhea unrelated to discontinuing oral contraceptives it was found that the incidence of oligomenorrhea in both groups was similar, about 40 percent.[200] There was no relation between the incidence of post-pill amenorrhea and the age of starting use of oral contraceptives or the duration of their use. The presence of oligomenorrhea before starting use of oral contraceptives is associated with a high rate of post-pill amenorrhea no matter what the age. Therefore, in general, oral contraceptives should not be prescribed to patients with hypothalamic pituitary dysfunction who are not having regular cyclic menses no matter what their age. A girl should have at least three regular spontaneous menses occurring at intervals of less than 35 days before starting oral contraceptives. Teenagers with oligomenorrhea have a low risk of conceiving due to infrequent or absent ovulation, and therefore should be advised to use a barrier method of contraception to avoid the increased possibility of post-pill amenorrhea developing.

Older patients are more concerned about the rare but serious adverse effects associated with oral contraceptive use such as thromboembolism, heart disease and stroke. Because these disorders are extremely rare in teenagers a possible increased risk associated with oral contraceptive use in this age group has not been documented. Most teenagers are not concerned about these problems, but are concerned about the frequent but less serious side effects, such as nausea, weight gain, edema, breast tenderness, breakthrough bleeding, failure of withdrawal bleeding and skin changes—for example, development of or increased severity of acne. Adolescent girls are very conscious of their physical image and are very disturbed about weight gain, edema and skin changes. Development of these changes and other symptoms frequently causes young girls to stop taking oral steroids and will result in unwanted pregnancies. To increase the rate of compliance it is important that patients be informed about the presence of these effects and be assured that many of the minor side effects, such as nausea, breast tenderness and breakthrough bleeding decrease in incidence with increasing duration of oral contraceptive use. Physicians should see patients after three cycles of oral contraceptive treatment to inquire about their symptoms, answer their questions and give reassurance. Most teenagers are healthy and have no medical contraindications to use of oral contraceptives, but the same contraindications that occur in older women, such as systemic metabolic disease, thromboembolism and active liver disease, can be present in teenagers. When medical contraindications exist, alternative methods of contraception should be used.

All combination oral contraceptives are equally effective, and no significant differences in the incidence of breakthrough bleeding or failure of withdrawal bleeding have been shown among the different formulations, although comparative studies have not been done. In deciding which formulation to prescribe initially for teenagers, it is best to use one with less than 50 μg of ethinyl estradiol, as the estrogenic component accounts for most of the undesirable metabolic effects.

Estrogens decrease sebum production, while the androgenic progestogens used in oral contra-

ceptives increase sebum production. Because acne is common in this age group, it is best to avoid formulations with the most androgenic progestogen, norgestrel, because these formulations cause a greater incidence and severity of acne than those with less potent progestogens. Use of the daily progestogens that contain no estrogen avoid many of the estrogenic symptoms such as fluid retention and nausea. However, these formulations have a higher frequency of irregular bleeding and a higher failure rate especially if the pill is not taken exactly at the same time every day. Therefore, it is best not to prescribe daily use of progestogens for teenagers.

The steroids have a long half-life. Therefore, most pregnancies in women using combination pills occur because a patient does not resume taking the pills after the week interval, rather than when a patient forgets to take one or two pills per cycle. To decrease the chance of delaying the interval of no medication for more than one week, it is best to give teenagers formulations containing packages of 28 pills instead of 21. In this way a pill is taken every day and there is less chance to forget to resume medication after an interval without ingestion of pills.

The use of high doses of estrogen postcoitally, which has been termed interception, should not be used for contraception. Interception is an emergency measure that should be used only after a single midcycle coitus and the medication must be started within 72 hours, otherwise the failure rate is high. Because of the high doses of estrogen with their associated side effects, interception should only be used once, and then a continuing method of contraception advised.

The use of IUD's has certain advantages for teenagers. It requires only one act of motivation and it does not have the systemic effects, which occur with oral contraceptives. IUD's also have a high rate of effectiveness, although slightly less than oral contraceptives. Pregnancy rates with the Copper-7 in nulliparous women are in the range of 1 percent to 2 percent. The disadvantages of IUD use are increased and irregular uterine bleeding and pain. Furthermore, there is evidence of about a sevenfold increased rate of pelvic infection in IUD users if they are nulliparous and younger than 25.[201] Most teenagers have more than one sexual partner and there is a greater chance of gonococcal salpingitis developing than in older, married women. As IUD's increase this risk further, use of IUD's by teenagers with multiple sexual partners will increase the incidence of subsequent infertility from tubal damage. At present, until more definitive data are available, it would appear prudent to avoid the use of an IUD in a nulliparous woman unless she has a single sexual partner. The risk of impairing future fertility because of the increased possibility of salpingitis, or ectopic pregnancy if there is contraceptive failure, must be considered when deciding upon use of an IUD in nulliparous women.

If a teenager has medical contraindications to oral contraceptives or does not wish to use them, then a diaphragm can be used with effectiveness provided the patient has sufficient counseling. Condoms also are effective. In one British study the accidental pregnancy rate with condoms in motivated couples was about 2.5 percent at 12 months.[202] In certain urban areas of the United States, the rate of teenage pregnancy decreases when free condoms are distributed widely.

Finally, it is necessary to state that abortion is not the answer to the problem of teenage pregnancy. It is much safer to prevent a pregnancy than to disrupt one after it occurs. Abortion, even when done by vacuum aspiration, is associated with a certain incidence of infection, perforation, intrauterine synechia and subsequent infertility. Also, most teenagers with unwanted pregnancies, do not elect to have an abortion, and if they do, they frequently have the procedure delayed until the gestation is in the second trimester. In addition, many teenagers do not have access to abortion services because of recent restrictive legislation. For these reasons every effort should be made to encourage sexually active teenagers to use effective contraceptives, particularly the orally taken steroids, to decrease the extremely high number of unwanted teenage pregnancies.

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